

One Health and antimicrobial resistance

I'm proud that our veterinary profession embraces the concept of One Health, where the health of humans, animals and the environment are closely linked. It's not a new concept for us, and our profession has generally welcomed the idea of transdisciplinary collaboration. However, it's not without its challenges. This integrative effort needs to occur not only on a local and national level, but on a global level as well.

According to the United Nations, the world's population reached 7.7 billion in 2019, and will increase to an estimated 9.7 billion by 2050 (1). What's really staggering is that the population projections indicate that a mere 9 countries will make up more than half of this projected growth. As the population expands, increased urbanization is creating larger geographic regions of overlap in human and animal habitat, both domestic and wild. Of course, this brings higher risk of zoonotic disease. Zoonotic diseases have a significant effect on public health worldwide, and an estimated 75% of emerging infectious diseases originate in domestic and wild animals (2). It's easy to focus on the public health aspects of this issue, however we need to ensure that the value of animal health and ecosystem health is communicated, rather than considering animals and the environment as mere sources of infectious diseases. Making animal health and welfare a priority will significantly contribute to the reduction of health risks for all involved.

Humans are becoming more urbanized, but we're also more mobile. Global travel is on the rise, particularly with younger generations. This is enhancing the risk of exposure to new viruses, bacteria and other disease-causing pathogens, and the risk of epidemics is constantly increasing. One must only look at the recent outbreak of COVID-19, a novel coronavirus, and how quickly it is spreading globally.

Bacterial zoonosis doesn't necessarily get the same airtime as other "trendy" topics like COVID-19, yet it's a huge concern. As bacteria are becoming increasingly resistant to conventional antibiotics, the situation represents one of the most serious threats to global health and food security. The veterinary profession is regarded as a key contributor in current and future antimicrobial reduction strategies. Currently, global data available on resistance patterns in animal pathogens are inadequate. Surveillance programs for antimicrobials are important so that we can assess the quantity of antimicrobial products used, the resistance levels and the patterns or trends over time.

On a global level, the World Organisation for Animal Health (OIE) has taken the lead by creating a global database on the use of antimicrobial agents in animals, in the framework of the Global Action Plan on Antimicrobial Resistance. In many countries, antimicrobial products remain widely available with virtually no restrictions or controls on their use. Of the 136 OIE members assessed in December 2019, almost three-quarters could not regulate veterinary medicinal products or had limited capability to exercise regulatory

and administrative control over their import, manufacture and market registration to ensure their safety and quality. Ultimately this means that the member countries were unable to ensure their responsible and prudent use in the field (3).

Canada has had strong ties to the OIE for many years, supporting their initiatives, including the antimicrobial database. Recently, the CVMA has undertaken a 4-year project called the National Veterinary Oversight System for Antimicrobial Use. This initiative will implement a sustainable data collection capability for antimicrobial use using electronic and dispensing information across the beef, poultry and swine sectors. As a 2nd project in this area, the Association worked with a panel of experts to develop guidelines for prudent use of antimicrobials involving many species. These guidelines are available to Canadian veterinarians and veterinary students on the CVMA website.

A report released by the Council of Canadian Academies found that 26% of infections were resistant to the antimicrobial agent used to treat them in 2018, and this resistance rate is expected to increase to 40% by 2050 (4). Obviously, the challenge in future years will be to identify new antimicrobials and anti-infection strategies with the hope that they will generate less resistance and have a reduced impact on non-target organisms and the environment (and our economy). Recently, a new antibiotic called Halicin was discovered with the use of artificial intelligence (AI). This is the first time that AI technology has identified a completely new antibiotic from scratch. Scientists are also exploring antibiotic alternatives such as antibodies, probiotics, bacteriophages and antimicrobial peptides.

This article scratches the surface on one aspect of One Health. I encourage everyone to attend our Annual Convention in July 2020, where topics in One Health are the focus of many sessions. See you in Quebec City!

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References

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